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VAN OUDENAREN, SARAH A				
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1793				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

### Office Action Summary

**Application No.**

10/561,845

**Applicant(s)**

ZAGHIB ET AL.

**Examiner**

SARAH VAN OUDENAREN

**Art Unit**

1793

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 37-41 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 43, 52 is/are allowed.
- 6) ☒ Claim(s) 1-36 and 42-52 is/are rejected.
- 7) ☒ Claim(s) 36, 40, 43 and 52 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-25, 42-46, 52, drawn to a process

Group II, claim(s) 26-36, 47-51 drawn to an anode

Group III, claim(s) 37-41, drawn to a process.

The inventions listed as Groups I, II, and III do not relate to a single general inventive concept under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups I and II share the special technical feature of an electrode of porous material. Groups I and II do not share the special technical feature of carbon coating by pyrolysis of the polymer layer as in Group II. Restriction has been required between Groups I and II, together, and Group II.

During a telephone conversation with William Rowland on November 19, 2009 a provisional election was made with traverse to prosecute the invention of Groups I and II, claims 1-36, 42-52. Affirmation of this election must be made by applicant in replying to this Office action. Claims 37-41 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Claim Objections***

Claims 36, 40, 43, and 52 are objected to by examiner.

Claim 36 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 36 requires a use as a negative electrode, the subject matter of claim 33. This is not considered to limit claim 33 insofar as claim 33 is the battery.

Claims 43 and 52 objected to because of the following informalities: Line 2 reads "... a compound is paste form". Examiner believes "is" should be "in" and appropriate correction is required.

Claim 52 is objected to as being a duplicate of claim 43.

Claim 40 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 40 is objected to as it depends from "the processes defined in claim 36" however claim 36 is not drawn to a process or multiple processes. It is the position of the examiner that claim 40 was meant to depend from instant claim 37 which is drawn to a process. It is noted that both 37 and 40 are drawn to a non elected group.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-26, 31-36, 40, 42-46, 50-52 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear as to what the claim intends as far as process steps. The wording of the instant claim is considered by examiner to be preamble only and not teach and positive process steps and is therefore considered indefinite.

Claim 2 recites the limitation "the mercury method" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 2 is further rejected as well as claims 3-5 and 15 as being unclear insofar as examiner is not certain what applicant intends by "terminals included."

Regarding claims 6-7, the "preferably" language of the instant claims renders the claim indefinite. It is unclear to examiner whether the limitations following said "preferably" language are required to meet the claim. It is the position of examiner that said limitations which are said to be preferable are not considered to be required to meet the claim.

Claim 12 recites the limitation "the void ratio" in line 2 and "the cavities" in line 2 and "the voluminal expansion" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitation "the porosimeter mercury method" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 20, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 20 recites the broad recitation "at least one non aqueous solvent that is an alcohol or a ketone", and the claim also recites "the non aqueous solvent being selected from the group consisting of methanol, ethanol, acetone and mixtures of at least 2 of these solvents" which is the narrower statement of the range/limitation.

Regarding claim 23, it is unclear to examiner what applicant intends by "about" as claim 23 requires the limitations of claim 22 which require y to be between 5 and 21. Examiner considers "about 21" to be less than 21.

Claim 31 recites the limitation "the liquid" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 32 recites the limitation "the type" in line 2. There is insufficient antecedent basis for this limitation in the claim. Further, it is unclear what applicant intends as "of the type  $\text{LiCoO}_2$ ,  $\text{LiFePO}_4$  ..." Still further, it is unclear as to what applicant intends to mean "of the 1 to 5 Volts type" and is therefore rendered indefinite.

Claim 33 recites the limitation "the rechargeable type" in line 2. There is insufficient antecedent basis for this limitation in the claim. Further, it is unclear as to what applicant intends to constitute "the rechargeable type" and as such is rendered indefinite.

Regarding claim 34, it is unclear to examiner what constitutes the electrochemical properties. The listing provided in the claim seems to include electrochemical performances which is unclear as this seems redundant to examiner as an electrochemical property. Alternatively, it seems that electrochemical performances is meant to be a heading to include the list below it. Examiner takes the position that any electrochemical performance would be sufficient to meet the limitations of the claim. Further, it is unclear to examiner whether the dimensions following the "preferably" language are required to meet the claim. It is the position of examiner that said limitations which are said to be preferable are not considered to be required to meet the claim. Still further, claim 34 recites the limitation "the storage test" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 36, it is unclear to examiner what is intended as the subject matter in the claim. Examiner takes the position that the claim is intended to require a lithium micro battery.

Claim 40 is rendered indefinite insofar as it depends from "the processes defined in claim 36" however claim 36 is not drawn to a process or multiple processes. It is the position of the examiner that claim 40 was meant to depend from instant claim 37 which is drawn to a process. It is noted that both 37 and 40 are drawn to a non elected group.

Regarding claim 42, it is unclear as to what process applicant is intending to claim. Claim 42 depends from claim 1 and is drawn to a process for the preparation of an electrode according to claim 1. Claim 1 requires the electrode be made of a porous material. It seems as though claim 42 is drawn to a process of making a material porous and not to making an electrode from a porous material. Further, claim 42 recited the limitation "the laser" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim 43 recites the limitation "the pasty solution" in lines 4-5, and "the UV radiation laser beam" in line 6. There is insufficient antecedent basis for these limitations in the claim. Further, it is unclear to examiner whether the plate support is to be made of glass as this limitation is in parentheses and is not clearly taught as a limitation of the claim. Examiner takes the position that this limitation is not required as it is within parentheses and similar to a preference.

Regarding claim 44, it is unclear what examiner intends to mean "at least one salt" as at least one implies one or more than one and applicant further defines the salt to be  $\text{NH}_4\text{F}$ . Examiner is uncertain if applicant intends for the at least one salt to include  $\text{NH}_4\text{F}$  or if the only salt present is  $\text{NH}_4\text{F}$ . Examiner takes the position that any additional salt may be present in addition to  $\text{NH}_4\text{F}$ .



Claim 45 recites the limitation "the  $\text{Si}_x\text{Li}_y$  type" in line 2. There is insufficient antecedent basis for this limitation in the claim. Further, it is unclear what applicant intends as a  $\text{Si}_x\text{Li}_y$  type.

Claim 50 recites the limitation "the rechargeable lithium ion type" in line 1. There is insufficient antecedent basis for this limitation in the claim. Further, it is unclear as to what applicant intends as a rechargeable lithium ion type.

Regarding claim 51, it is unclear to examiner what constitutes the electrochemical properties. The listing provided in the claim seems to include electrochemical performances which is unclear as this seems redundant to examiner as an electrochemical property. Alternatively, it seems that electrochemical performances is meant to be a heading to include the list below it. Examiner takes the position that any electrochemical performance would be sufficient to meet the limitations of the claim. Further, it is unclear to examiner whether the dimensions following the "preferably" language are required to meet the claim. It is the position of examiner that said limitations which are said to be preferable are not considered to be required to meet the claim. Still further, claim 34 recites the limitation "the storage test" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 52, it is unclear as to what claim 52 is intended to claim insofar as it seems to be a duplicate of claim 1. Further, claim 52 recites the limitation "the UV radiation laser beam" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claims 35 and 36 provides for the use of an anode, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 35 and 36 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Shin et al (Porous silicon-based electrodes for lithium batteries, *Electrochemical Society Proceedings*, Volume 2002-26, 2002).

Shin teaches a process for the preparation of an electrode for a lithium battery. The electrode is made from porous silicon (see abstract). Examiner considers a lithium

battery to be an electrochemical system. It is noted that there are no positive recited process steps in the instant claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-21, 26-27, 29-31, 35, 44, and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (Porous silicon-based electrodes for lithium batteries, Electrochemical Society Proceedings, Volume 2002-26, 2002).

Shin teaches a process for the preparation of an electrode for a lithium battery. The electrode is made from porous silicon (see abstract). Examiner considers a lithium battery to be an electrochemical system, as discussed above. As the electrode is taught to be made of a porous material, it would be obvious to one of ordinary skill in the art at the time of the invention that the porosity would vary from 1-99%. It is unclear what the mercury method is intended to be and therefore examiner considered the teaching of Shin that the silicon is porous to be sufficient to convey porosity.

Regarding claim 3, as the electrode is taught to be made of a porous material, it would be obvious to one of ordinary skill in the art at the time of the invention that the porosity would vary from 20-80%.

Regarding claim 4, Shin teaches the pores to be 1-3 $\mu$ m (pg 519, paragraph 1).

Regarding claim 5, it would have been obvious to one of ordinary skill in the art at the time of the invention to create pores of any desired size dependant upon the function and materials of the desired battery. Further, Shin teaches the pore size becoming smaller and the wall becoming thicker (pg 521, lines 1-2).

Regarding claim 6, Shin teaches the pores are well ordered (pg 519, lines 1-3). It is noted that the range which is taught to be preferable is not considered to be required.

Regarding claim 7, Shin teaches the pores to be deep (pg 519, lines 1-3 and figure 1A).

Regarding claim 8, Shin shows in figure 1A that the pores do not extend through the material.

Regarding claim 9, Shin teaches the porous material to be silicon (see abstract and pg 518-519). Silicon is considered to be capable of forming an alloy with an alkali metal.

Regarding claim 10, Shin teaches the porous material to be silicon (see abstract and ph 518-519).

Regarding claim 11, Shin teaches the porous silicon being prepared in an electrochemical cell (pg 519, paragraph 1).

Regarding claim 12, as Shin teaches the porous material being porous silicon with a pore size similar to the instant application, as discussed above, it would be obvious to one of ordinary skill in the art at the time of the invention that as the materials are similar they would behave similarly and therefore the material of Shin would be able

to absorb the voluminal expansion generated during formation of the alloy with the alkali metal.

Regarding claim 13, Shin teaches the material being porous silicon (pg 521, paragraph 3).

Regarding claim 14, Shin teaches the porous silicon to have a high reactivity with lithium (pg 521, paragraph 3).

Regarding claim 15, as the electrode is taught to be made of porous silicon, as discussed above, it would be obvious to one of ordinary skill in the art at the time of the invention that the porosity would vary from 5-95 volume%. It is unclear as to what is considered to be the porosimeter mercury method.

Regarding claim 16, as the electrode is taught to be made of porous silicon, as discussed above, it would be obvious to one of ordinary skill in the art at the time of the invention that the porosity would be about 75 volume% as porosity is clearly a desired property as Shin teaches porous silicon has a high reversible specific capacity (pg 521, paragraph 3). It is unclear as to what is considered to be the porosimeter mercury method.

Regarding claim 17, Shin teaches a porous silicon wafer being utilized (pg 519, paragraph 3).

Regarding claim 18, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize any known source of silicon utilized in the art, such as a silicon monocrystal.

Regarding claims 19-21, and 44 Shin teaches the electrode to be used as an anode and be made of porous silicon (abstract and pg 518-519). It is noted that the process of claims 1 and 13 are to an electrode from a porous material and not a method of making the material porous. Therefore any known method of making a material porous would have been obvious to one of ordinary skill in the art at the time of the invention.

Regarding claim 26, Shin teaches the electrode being used as an anode (see abstract and pg 518-519).

Regarding claim 27, Shin teaches the electrode being made of porous silicon as discussed above, therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to understand that the electrode is substantially made of porous silicon and therefore is at least 40% porous material.

Regarding claim 29, figure 1A of Shin does not show evidence of cracking. Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to substantially eliminate cracks as cracks would be considered detrimental to the material.

Regarding claim 30, Shin teaches an electrochemical cell which includes an anode prepared from porous silicon which is taught to be the working electrode, a cathode which is taught to be a counter electrode, and an electrolyte (pg 519, paragraph 4).

Regarding claim 31, Shin teaches the electrolyte to be a liquid solution of  $\text{LiPF}_6$  (pg 519, paragraph 4).

Regarding claim 35, Shin teaches the electrode to be used in a lithium battery (abstract) which is considered by examiner to constitute an electrochemical system.

Regarding claims 47-49, Shin teaches the electrode being made of porous silicon as discussed above, therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to understand that the electrode is substantially made of porous silicon and therefore is at least 40% or 60% porous material.

Claims 22-25, and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (Porous silicon-based electrodes for lithium batteries, Electrochemical Society Proceedings, Volume 2002-26, 2002) as applied to claims 1 and 14 above, and further in view of Weydanz et al (A room temperature study of the binary lithium-silicon and the ternary lithium-chromium-silicon system for use in rechargeable lithium batteries, Journal of Power Sources 81-82, 1999).

Shin teaches a process for the preparation of an electrode for a lithium battery. The electrode is made from porous silicon (see abstract). Examiner considers a lithium battery to be an electrochemical system.

Shin does not explicitly teach the specific silicon and lithium alloy formed.

Weydanz teaches several Li-Si alloys which possess considerably higher energy densities than the commonly used anode materials for rechargeable lithium batteries. Such alloys are taught to be  $\text{Li}_{12}\text{Si}_7$ ,  $\text{Li}_7\text{Si}_3$ ,  $\text{Li}_{13}\text{Si}_4$ , and  $\text{Li}_{21}\text{Si}_5$  (pg 237, section 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the alloys of Weydanz with the electrode of Shin as not only would similar alloys

be expected to form, such alloys would be desired as they are known to possess considerably higher energy densities than the commonly used anode materials.

Regarding claim 23, Weydanz teaches  $\text{Li}_{21}\text{Si}_5$  (pg 237, section 1). As the instant claim requires x to be "about 4", examiner considered 5 to meet the "about" limitation.

Regarding claims 24-25, Weydanz teaches the alloys to be  $\text{Li}_{12}\text{Si}_7$ ,  $\text{Li}_7\text{Si}_3$ ,  $\text{Li}_{13}\text{Si}_4$ , and  $\text{Li}_{21}\text{Si}_5$  (pg 237, section 1) which are considered to be of the  $\text{Si}_x\text{Li}_y$  type. It is noted that the process of claim 1, from which claim 24 ultimately depends, is to an electrode from a porous material and not a method of making the material porous. Therefore any known method of making a material porous would have been obvious to one of ordinary skill in the art at the time of the invention.

Regarding claims 45-46, Weydanz teaches the alloys to be  $\text{Li}_{12}\text{Si}_7$ ,  $\text{Li}_7\text{Si}_3$ ,  $\text{Li}_{13}\text{Si}_4$ , and  $\text{Li}_{21}\text{Si}_5$  (pg 237, section 1) which are considered to be of the  $\text{Si}_x\text{Li}_y$  type. Shin teaches the material to be porous silicon as discussed above. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize any known source or lithium and also utilize a known temperature and time optimal for forming the above discussed alloys.

Claims 28, 32-34, 36, 42, 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (Porous silicon-based electrodes for lithium batteries, Electrochemical Society Proceedings, Volume 2002-26, 2002) as applied to claims 1 and 27 above, and further in view of Yoshida et al (EP 1,213,778).



Shin teaches a process for the preparation of an electrode for a lithium battery. The electrode is made from porous silicon (see abstract). Examiner considers a lithium battery to be an electrochemical system.

Shin does not explicitly teach the anode being at least partly coated with carbon.

Yoshida teaches a polymer gel electrolyte for a lithium battery wherein the battery includes an anode, cathode, and an electrolyte (pg 21, 0163). Yoshida teaches that in a lithium ion battery the negative electrode, also known as the anode, may include a conductive material which carbon. Further, carbonaceous materials are known to be capable of reversibly adsorbing and releasing lithium ions (pg 22-23, 0180-0181).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the carbon of Yoshida with the anode of Shin in order to reversibly adsorb and release lithium ions as well as utilize a known conductive material.

Regarding claim 32, Yoshida teaches the cathode material is to be selected as appropriate for the electrode application, the type of battery, and other considerations. For instance, in a lithium ion battery, suitable examples include  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ , and  $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$  wherein M can be manganese, and x is 0.05-1.1 and y is 0.5-1.0 (pg 22, 0167-0170).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the cathode materials of Yoshida with the system of Shin as Yoshida teaches the cathode materials to be useful in a lithium ion battery and as Shin is also a lithium ion battery, such materials would obviously be useful.

Regarding claim 33, Shin teaches the electrodes to be used in a rechargeable lithium battery (pg 521, paragraph 3).

Regarding claim 34, Shin teaches a battery (abstract, pg 520-521). A battery, as taught by Shin, is considered by examiner to be an electrochemical system and therefore would have an electrochemical performance. While Shin does not explicitly teach a micro battery, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the battery as a micro battery dependant on the desired function. It is noted that the dimensions are not required to meet the limitations of the claim.

Regarding claim 36, Shin teaches a lithium battery (abstract). While Shin does not explicitly teach a micro battery, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the battery as a micro battery dependant on the desired function.

Regarding claim 42, Yoshida teaches the cathode material is to be selected as appropriate for the electrode application, the type of battery, and other considerations. For instance, in a lithium ion battery, suitable examples include  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ , and  $\text{Li}_x\text{Ni}_y\text{M}_{1-y}\text{O}_2$  wherein M can be manganese, and x is 0.05-1.1 and y is 0.5-1.0 (pg 22, 0167-0170).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the cathode materials of Yoshida with the system of Shin as Yoshida teaches the cathode materials to be useful in a lithium ion battery and as Shin is also a lithium ion battery, such materials would obviously be useful.

As Shin teaches the electrode to be made of a porous material and the materials of Yoshida are obviously useful with Shin, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize any known method to make said materials porous.

Regarding claim 50, Shin teaches the electrodes to be used in a rechargeable lithium battery (pg 521, paragraph 3).

Regarding claim 51, Shin teaches a battery (abstract, pg 520-521). A battery, as taught by Shin, is considered by examiner to be an electrochemical system and therefore would have an electrochemical performance. While Shin does not explicitly teach a micro battery, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the battery as a micro battery dependant on the desired function. It is noted that the dimensions are not required to meet the limitations of the claim.

#### ***Allowable Subject Matter***

Claims 43 or 52 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. It is noted that either claim 43 or 52 is allowable as 52 is a duplicate of 43.

The following is a statement of reasons for the indication of allowable subject matter: the subject matter of claim 43 or 52 is allowable as it is not known in the art at the time of the invention to create a cathode utilizing the instantly claimed method.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH VAN OUDENAREN whose telephone number is (571)270-5838. The examiner can normally be reached on Monday-Thursday, 9:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SARAH VAN OUDENAREN/

Examiner, Art Unit 1793

January 14, 2010

/Melvin Curtis Mayes/

Supervisory Patent Examiner, Art Unit 1793